UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF PREVENTION,
PESTICIDES AND TOXIC SUBSTANCES

MEMORANDUM

DATE: July 28, 1998

TO: Angel Chiri, CRM
Special Review and Reregistration Division

FROM: David Farrar, Statistician, EFED task leader for terbufos
Environmental Risk Branch II
Environmental Fate and Effects Division (7507C)

THROUGH: Betsy Grim, Acting Branch Chief
EFED/ERB II

RE: **Terbufos**: EFED understanding of tasks and needs related to the American Cyanamid rebuttals

On July 7 the EFED terbufos team (J. Breithaupt, D. Farrar) met with SRRD staff (L. Nisenson, A. Chiri) to discuss work to be done by EFED to respond to documents submitted by American Cyanamid, related to the EFED chapter of the terbufos RED, and to complete the EFED sections of the RED. The purpose of this note is to confirm with SRRD our understanding of the additional work that should be done, and to indicate *some areas where we need input from SRRD.*

Attached is a list of issues from the rebuttals that EFED may need to address in order to respond fully. Some of the issues can be addressed without much additional work, as we have discussed informally with SRRD; however, the list is presented here without comment. Some of the items were addressed when EFED recently revised our RED chapter to incorporate the drinking water assessment (draft transmitted on 2/5/98, D. Farrar to L. Nisenson-Bergstrom).

Based on our recent meeting with SRRD, here is what we think EFED needs to do:

- Jim Breithaupt will obtain *estimates of the concentrations of terbufos metabolites (terbufos sulfoxide and terbufos and sulfone) in drinking water*, for use in the dietary risk assessment. It is our understanding that the principal dietary risk that has been identified at this time is from residues in imported bananas. Apart from this exposure, it is our understanding that dietary risk concern levels are not exceeded. The greatest risks from the domestic uses (corn, sorghum, sugarbeets) may be via drinking water. Therefore SRRD believes that the surface water results may be important to the bottom-line conclusion on health risk. *The HED terbufos team members should be notified and consulted on the plan to estimate drinking water concentrations of terbufos metabolites*.

- Jim Briethaupt will address *miscellaneous additional items related to fate and transport of terbufos in the environment* (see list attached).

- The registrant has presented extensive material on the EFED's discussion of *risk to birds and other terrestrial wildlife.* Although terrestrial risk is less a focus of the Agency at this time than aquatic risk (based on the large number of aquatic incidents), we may need to respond to this material at some level. We would like to obtain the assistance of a terrestrial biologist, possibly from another EFED branch, to review the rebuttal documents and advise us on how best to respond to the issues raised by the registrant. The biologist who did the terrestrial risk assessment is now in another branch.

- The rebuttals discuss field studies of effects on birds and other terrestrial wildlife, not considered in our RED chapter. *Please determine whether the terrestrial field studies by Tank et al. and Knapton and Mineau, cited in the rebuttals, were ever submitted for review in the Agency*. Although the Agency is focusing primarily on aquatic rather than terrestrial risk at this time, without some review of the field studies we would not be able to comment on conclussions the registrant has drawn from them.

- The EFED's perception of aquatic risk is based to a large degree on fish kill incidents. Therefore it seems we may need to *focus particularly on the interpretation of the fish kill incidents in the rebuttal*. We believe that issues related to aquatic risk can be adressed by an aquatic biologist in ERB II. The aquatic biologist would also review the rebuttals and advise us on how to address various issues in the list (attached).

- SRRD brought to our attention that there was recently a fish kill incident in Illinois that was the basis for a lawsuit. It seems desirable to look into this before finalizing the EFED RED chapter, however *our incident group has not yet received any information on that incident for review. When we receive some information, we will modify the RED as appropriate.* In the mean time, we will proceed to address other issues that do not require this information.

- Given that we may be sharing out some tasks related to the rebuttals, *it will be helpful to us if SRRD will transmit a bean for response to the rebuttals.*

Additional beans suggested for work related to the rebuttal. We suggest that SRRD generate two beans, one for work by a terresrial biologist and one for an aquatic biologist, in addition to the bean already generated for revision of the RED based on the rebuttals. These beans will be particularly helpful if we inlist biologists outside ERB II for work on the rebuttal. We suggest the following wording for the two beans:

• **For the terrestrial biologist**: "Review the document submitted by Environmental Planning and Toxicology, with respect to the risk of terbufos to birds and other terrestrial wildlife. Work with the EFED terbufos task leader to finalize the list of issues to be addressed and to develop a plan for addressing the issues. Provide additional review as needed to address the issues. Advise the task leader on any needed modifications of the ecological risk assessment in the EFED chapter. Provide peer review for the ecological risk assessment, as needed."

• **For the aquatic biologist:** "Review the document submitted by Environmental Planning and Toxicology, with respect to the risk to fish and other aquatic life. Review the rebuttals of the fish kill incidents in that document and determine whether the descriptions of the incidents in the current RED chapter need to be modified. Work with the EFED terbufos task leader to finalize the list of issues to be addressed, based on the EP&T document, and to develop a plan for addressing the issues. Provide additional review as needed to address the issues. Advise the task leader on any needed modifications of the ecological risk assessment in the EFED chapter. Provide peer review for the ecological risk assessment, as needed."

cc Betsy Grim
Jean Holmes
Jim Breithaupt
Denise Keehner
Ed Fite

<u>Attachment</u>: **Rebuttal documents submitted by American Cyanamid**.

The EFED has received two documents for review:

(1) An Analysis of the Environmental Fate of Terbufos: A Response to EPA on the Preliminary Science Chapters of the RED" prepared by AC 4/18/96 (the "AC Fate Analysis.") Cover memo J. Wrubel (Am. Cyanamid) to A. Farrell (USEPA), 4/29/96.
(2) "Ecological Risk Assessment for COUNTER® Systemic Insecticide-Nematicide" prepared by Ecological Planning and Toxicology, Inc. (The "EP&T Report"), 3/14/96, with cover memo 4/3/96 J.Wrubel to A. Farrell.

Following is a list of items from the review that EFED may need to address. The symbol ‡ indicates an item that we think can be adressed without significant additional effort. Some of these relate to risk assessment policy that EFED has applied consistently in our risk assessments. For these, a specific response for terbufos may not be desirable. (Generic issues might better be addressed generically.)
Other items may require that we inlist a technical specialist.

Issues related to EFEDs aquatic risk assessment.

‡ The EP&T report states that the most sensitive tested invertebrate is *Daphnia* (LC50=0.2 ppb) and that: "The most sensitive species of aquatic invertebrates may experience a local reduction, but the total invertebrate biomass may not be reduced because of tolerant invertebrate species so that the food base for fish is unaffected. This has been documented in field studies with other organophosphorus insecticides (a paper by J. Giddings is cited).

‡ The EP&T report states (Section 6.2.1, p. 56) that USEPA has relied on a deterministic exposure model that does not address various sorts of variability.

‡ The rebuttals argue that aquatic incidents are related to unusual combinations of circumstances promoting runoff, including slope, soil condition, and weather.

‡ The rebuttals point out that exposure estimates based on a "farm pond" scenario are not necessarily appropriate for addressing impacts on larger bodies of water such as rivers and lakes.

‡ The EP&T report suggests (Section 6.2.3, p. 59) that farm ponds are artificially stocked with game species and have limited significance in maintaining the genetic diversity of populations of native species.

‡ The rebuttals point out that farm ponds may be frequently disturbed by human activities.

‡ When compared to the 85th percentile of STORET values, the EEC's are below the level of concern (pages 48 and 55).

‡ The fishkill reports do not take into account eutrophication, turbidity and/or ammonia poisoning as a cause (p 58.)

‣ The EP&T report comments exensively on the Agency's interpretation of specific fishkill incidents.

Issues related to EFEDs assessment of risk to birds and terrestrial wildlife.

- ‡ The EP&T analysis concludes that the bird species most at risk would be ground-feeding insectivores and omnivores such as robins, particularly in wet years. The analysis asserts that the Breeding Bird Survey does not show population declines for such species.
- ▸ The EP&T analysis discusses recent terrestrial field studies that apparently were not considered in the EFED RED chapter (Tank et al., Knapton and Mineau). We need to determine whether this material was ever submitted for review in the Agency, and then decide how we should respond.
- The EP&T analysis includes a discussion of the properties of terbufos granules as these properties may affect attractiveness to birds, arguing (p. 10) that: "The clay granules used for COUNTER 15G® may not be viewed by birds as an adequate source of grit. The inert material used for COUNTER CR® is rather soft and does not look or feel like silica particles and also may not be viewed by birds as adequate for grit."
- The EP&T analysis presents extensive discussion of the risk from ingestion of invertebrate prey items, concluding that exposure concentrations would not usually be lethal.
- The EP&T analysis concludes that the bird species most at risk would be ground-feeding insectivores and omnivores such as robins, particularly in wet years. The analysis asserts that the Breeding Bird Survey does not show population declines for such species.
- The EP&T analysis comments (Section 4.1.2) on uncertainties associated with the use of LD50/ft2. The issues raised are generic and not specific to terbufos.

Miscellaneous issues related to environmental fate and transport and water quality.

- ▸ The registrant argues (in the AC Fate Analysis) that formation of the sufloxide and sulfone in soil is not a 1:1:1 process, but conservatively 1:1/2:1/4. These ratios appear to be based on peak concentrations observed in aerobic soil metabolism studies (see p. 14), i.e., for each degradate the concentration rises to a peak and then declines, with the peak concentration of the sulfoxide about 50% of the initial concentration of parent and the peak concentration of sulfone being about 25% of parent.
- The registrant argues that terbufos degrades more rapidly than the RED chapter indicates.
- "Contrary to what was presented in the draft science chapters, the predominant terbufos metabolites found in laboratory studies were carbon dioxide and formaldehyde" (p. 4)"
- The registrant cites Goolsby and Battaglin (1995) as demonstrating that terbufos is one of the least frequently detected pesticides in surface water (see particularly page 25). In particular they say that terbufos has not been detected in the NAWQA unit with the White , Missouri, and Ohio rivers.
- The registrant asserts that ground water detections reported in the EFED chapter have been discounted.
- The registrant disputes that the detection trigger for restricted use is met for ground water (p. 22-24).
- The EP&T report cites (p. 48) runoff studies for granular pesticides (Wauchope, 1978) and terbufos specifically (Felsot, 1990) as indicating that only a small percentage of

pesticide applied will be lost in runoff.